Substitute specification Approved for entry LV 11/20/06

MULTI-MODAL FORCED VORTEX DEVICE

[0001] This application is related to U.S. provisional patent application, entitled "Unmanned, Sea, Land, Air, Vehicle, (U.S.L.A.V.): an All Terrain Unmanned, Submersible, Wall Climbing, Flying Vehicle" (serial no. 60/431,776), filed 9 December 2002.

Background

[0002] The invention relates to the area of forced vortex technology. More specifically, but not by way of limitation, the invention is directed to a multi-modal forced vortex device that can generate variable magnitude (1) attractive forces, (2) down or pushing forces, (3) up or lifting forces, and (4) yaw, pitch and roll forces.

[0003] In recent years there have been substantial advancements in understanding the physics of forced vortex technology. Generally, when a set of partially enclosed blades is made to rotate, the rotating blades create a positive or negative pressure inside the partially enclosed volume (relative to the environment outside the partially enclosed volume) depending upon the speed and direction of the rotating blades and the amount and direction of fluid (*e.g.*, air or water) flowing through the enclosed volume. When the pressure within the partially enclosed volume is negative relative to the ambient pressure, surrounding fluid rushes into the lower pressure area around the blades creating a down-force on the device housing the rotating blades. Alternatively, when the pressure within the partially enclosed volume is